

NOTES.

THE gentlemen's conversazione at the Royal Society will be held on Wednesday next, May 9.

THE summer meeting of the American Chemical Society will this year be held in Ithaca, N.Y., on June 28-30.

It is announced that the German Government has issued invitations for an International Conference on Wireless Telegraphy to meet on June 28.

THE sixth International Congress of Applied Chemistry was opened at Rome on April 26 by the King and Queen of Italy in the presence of the Diplomatic Body, the members of the Cabinet, high officials of the State, and about two thousand delegates. Speeches were delivered by Prof. E. Paternò, president of the congress, Signor Boselli, Minister of Public Instruction, Prof. O. Witt, and delegates of the chief nations represented at the congress. The British delegates are Prof. W. A. Tilden, F.R.S., Prof. W. N. Hartley, F.R.S., and Dr. J. J. Dobbie, F.R.S.

A REUTER telegram from New York states that the new French liner *La Provence*, when 1800 miles from Poldhu and 1700 miles from Cape Cod, on April 25 at 2 p.m., simultaneously communicated by wireless telegraphy with both stations, and received answers from both.

ACCORDING to the *Chemiker Zeitung* there were 183,532 persons connected with chemistry who were insured against accident in Germany in 1904; of these, 1535 cases received compensation from the insurance companies. This number includes 109 cases of death, 14 completely and 1040 partially incapacitated from following their vocation in life, whilst 372 were only for a time unable to work; the amount paid to the injured or the relatives of the deceased was nearly 2,200,000 marks.

IN honour of the International Medical Congress to be held in Lisbon this year, there has been opened a small exhibition of the products of the Portuguese colonies in the rooms of the Colonial Museum. The exhibits, which are chiefly from Cape Verde, Mozambique, the Portuguese Indies, Angola, Timor, and Guinea, deal almost exclusively with wool, coffee, cocoa, and india-rubber; palm oil, &c., and other raw materials of the fatty and oil industries, although important exports of the Portuguese colonies, are not represented.

ARRANGEMENTS are being made to hold a "Country in Town" exhibition at the Whitechapel Art Gallery in July. The object of the exhibition is to show East Londoners what can be done to bring into the neighbourhood something of the beauty of nature. It is proposed to show living things, pictures and models, materials and appliances, plans for the improvement of certain areas in London, and exhibits explaining city life in Japan and other countries. Contributions towards the necessary expenses are asked for, and these may be sent to the Rev. Canon Barnett at Toynbee Hall, E.

THE ninth annual meeting of the Childhood Society will be held on Tuesday next, May 8, at the residence of the president, Earl Egerton of Tatton. Sir Edward Brabrook, C.B., will deliver an address. The chief object of the society is to promote the study of educational methods and of the environment of children during school life, best suited to ensure satisfactory mental and physical development of children. The society numbers among its members representatives of educational science, teachers, medical experts, and others interested in the investigation of mental and physical conditions of childhood.

NO. 1905. VOL. 74]

EARTHQUAKE shocks have again been common during the past week. Reuter's messages show that on April 25 a disturbance was felt at 3.15 p.m. at San Francisco, and lasted nearly a minute. This shock was also felt at Oakland and Berkeley. On April 26 shocks were felt at Salinas, 100 miles south of San Francisco, at 8 p.m. and 9.50 p.m., and these were followed by a third on April 27 at 2 a.m. Each of these three disturbances lasted about four seconds. A later telegram reports that earthquakes were felt at Salinas every day from April 18 to 27. On April 27, too, four disturbances of increasing intensity were felt at Dresden, and on April 28 in Schönberg, Brambach, and other places in the Vogtland district. Two slight shocks were felt at San Francisco on the morning of April 30.

It is arranged that the International Association for Testing Materials, which holds its congresses about every three years in industrial centres in various countries, shall this year meet in the Academy of Science at Brussels on September 3-8. The King of Belgium has accorded the congress his patronage, while Prince Albert of Belgium will be one of the honorary presidents, as also will the Ministers of Finance, Railways, War, and Trade, and the Mayor of Brussels. Among the papers to be read will be one on the industries of Belgium, by Baron E. de Laveleye and M. Camerman. It is expected that a considerable number of members and delegates from this country will be present at the congress. Mr. J. E. Stead, F.R.S., Middlesbrough, is the English secretary of the association.

At the annual general meeting of the Institution of Civil Engineers, held on April 24, Sir Alexander B. W. Kennedy, F.R.S., was elected president of the institution. The council has made the following awards for papers read and discussed before the institution during the past session:—A Telford gold medal to Mr. J. A. Saner, a Watt gold medal to Mr. G. G. Stoney, and a George Stephenson gold medal to Dr. T. E. Stanton; Telford premiums to Mr. Leonard Bairstow, Mr. H. S. Bidwell, Mr. J. J. Webster, Mr. Cathcart, Mr. W. Methven, Mr. H. A. Mavor, Sir Frederick R. Upcott, K.C.V.O., C.S.I., and a Manby premium to Mr. D. E. Lloyd-Davies. The presentation of these awards, together with those for papers which have not been subject to discussion, and will be announced later, will take place at the inaugural meeting of next session.

IN Tennyson's "Palace of Art" occur the lines:—

"She saw the snowy poles and Moons of Mars,
That mystic field of drifted light
In mid Orion, and the married stars."

This at first sight looks like a literary parallel to Swift's well-known fortuitous forecast of the discovery of the Martian satellites, and Mr. J. S. Stevenson, writing from Blairavon, Norwood, Ceylon, points out that Prof. H. H. Turner quotes it in "Modern Astronomy" as having been written in 1835. This, however, appears not to have been the case; for Mr. Stevenson, on reference to the biography of the late poet laureate by the present Lord Tennyson has found the note, "The 'Moons of Mars' is the only modern reading here, all the rest are more than half a century old." Scientific discovery was thus not anticipated by Tennyson in the mention of Martian satellites.

THE Paris correspondent of the *Times* made the following announcement in a message on Monday night:—"The Prince of Monaco formally announced to the French Minister of Education to-day his decision to establish in Paris the Oceanographic Institute that he has founded. He will endow the institute with the magnificent museum

now existing at Monaco, including its laboratories, collections, aquaria, &c. The Prince has set apart 4,000,000 francs (160,000*l.*) for the maintenance of the institute. It will be established on grounds recently bought by the University of Paris with the assistance of the Prince in the rue Saint-Jacques and the rue d'Ulm. The scientific direction of the institute is vested in an international committee of specialists in oceanography. The French Government has expressed its formal thanks for this really princely gift."

THE first of a series of four lectures on atmospheric circulation and its relation to weather was delivered by Dr. W. N. Shaw at the University of London on Tuesday, May 1. Dr. Shaw referred to the valuable contributions to meteorology in the last fifty years by Dr. Buchan, Abercromby, and Clement Ley, and he pointed out that, so far as the forecasting of the weather is concerned, no great advance has been made in recent years, and that it is necessary to take into consideration the atmosphere in the upper regions and to deal with the general circulation as a whole. Great advance has been made recently in that way by the use of kites and balloons, and the direction of the air currents in the higher regions can be determined from the records of the barometer, thermometer, and hygrometer obtained in those ascents. Some very interesting diagrams were thrown on the screen, showing the circulation at a height of 4000 metres, from charts constructed by M. Teisserenc de Bort, and also showing the results of international upper-cloud observations as deduced by Dr. Hildebrandsson for various parts of the globe.

THE contents of Irish Fisheries Scientific Investigations, 1904, No. 6 (1905), includes a paper on "plankton" collected at light-stations, by Dr. L. H. Gough, and hydrographical observations made at the same. In connection with the plankton, it is noticeable that when this comprises a large number of copepod crustaceans, the vegetable organisms are much less numerous than usual, and *vice versa*.

THE four articles in the April issue of the *Zoologist* are equally divided between birds and fishes. In recording the rare birds seen in Norfolk during 1905, Mr. John Gurney again notices the occurrence of quite a number of avocets on Breydon Flats. The birds of Derbyshire, as observed in 1904-5, form the subject of an article by the Rev. Mr. Jourdain. Mr. L. E. Adams describes his own observations on the mode of flight of flying-fishes, while Prof. McIntosh discusses certain Japanese food-fishes.

SIX new fishes from Japan, described by Messrs. Jordan and Seale, form the subject of No. 1445 of the Proceedings of the U.S. National Museum; while the succeeding number of the same journal (No. 1446) is devoted to descriptions of new American Palæozoic ostracod crustaceans, by Messrs. Ulrich and Bassler. In No. 1447 of the Proceedings Mr. J. W. Gidley describes the skull of a ruminant allied to the musk-ox from Pleistocene strata in New Mexico. The new generic name *Liops* is proposed for this ruminant, which is of special interest on account of its southern habitat.

THE trustees of the Indian Museum, Calcutta, according to the report for the past financial year, have decided to charge an admission-fee of 8 annas on Sundays between the hours of 3 p.m. and 5 p.m., in order to give the educated classes an opportunity of studying the contents of the galleries under more favourable opportunities than has

been hitherto possible. As a rule, the galleries are absolutely crowded with members of the illiterate class throughout the time when they are open to the general public. It is proposed greatly to enlarge the museum, at an estimated cost of 2½ lakhs of rupees—a sum apparently already at the disposal of the trustees.

MR. F. A. LUCAS, curator of The Museum, Brooklyn Institute of Arts and Sciences, Brooklyn, N.Y., desires to direct attention to a photograph of Laysan Island, issued several years ago, showing on the beach a large turtle, and, what is more important, a large seal, which appeared to be of the genus *Monachus*. He points out that if this seal really belongs to the genus *Monachus*, the fact is of great scientific interest, as it would make the seal circumtropical. Mr. Lucas would be glad to know if anything has been published regarding this seal, specimens of which he believes were taken to Europe.

A PAMPHLET has reached us containing an address delivered by Dr. Paul Kronthal before the Berlin Psychological Society in October of last year on the idea of the soul (Jena: Gustav Fischer). The lecturer, continuing the investigation of which notice has already been taken in these columns, elaborates his account of the soul as the sum of reflexes. This definition, he claims, does justice to all the facts, *e.g.* of inheritance of physical characteristics, of mental disease, of memory, and the like. He occupies several pages with a discussion of the freedom of the will, a conception which, it appears, is abandoned by all consistent theologians, men of science, historians, and jurists. But it appears also from the later half of the lecture that to define the soul as the sum of reflexes satisfies only natural science; from the standpoint of metaphysics we must speak of the soul as sensation. Apparently, too, the metaphysical view leads directly to solipsism, and the metaphysical world consists of abstractions like love, hate, joy, sorrow, good, bad. The world of the scientific man, on the other hand, is made up of five entities, which at first sight appear very real as compared with these abstractions, but which are ultimately admitted to be five metaphysical ideas—time, space, matter, energy, number. It is further admitted that the fundamental law of causality is for natural science undemonstrable. Dr. Kronthal concludes his somewhat paradoxical lecture with two dicta—that the honourable metaphysician must grant that the conceptions of natural science are the more justifiable, and that no thoughtful man of science can deny that the conceptions of natural science are in the last resort only matters of faith.

A CATALOGUE of microscopical objects and accessories has been received from Mr. R. G. Mason; a special feature is made of geological and stained botanical sections that can be mounted by purchasers. A section of limestone sent as a sample of the mounted objects shows a variety of Foraminifera, and is otherwise a desirable specimen, also a double-stained section of pine stem is a thoroughly satisfactory preparation.

THE second number of the *Journal of Economic Biology* contains papers on the effects of metazoan parasites on their hosts, by Messrs. Shipley and Fearnside; on the bionomics of grain weevils, by Mr. F. J. Cole; on the deposition of eggs and larvæ in *Cestrus ovis*, by Mr. W. E. Collinge; and on the ox-warble flies, by Mr. A. D. Imms. The reviews and current literature, with notes, which complete the number are a valuable feature of the journal.

A SERIES of identifications of Philippine plants is published in Publication No. 35 of the Bureau of Government Laboratories, Manila. Mr. H. N. Ridley has worked out the Scitamineæ, describing three new species of *Amomum*; Mr. C. B. Clarke has named the Acanthaceæ; Dr. E. Häckel has identified a collection of grasses; and Mr. E. D. Merrill contributes some notes on Cuming's Philippine plants, as well as the fourth series of diagnoses of new or noteworthy plants. Among the latter are two new species of Rhizophoraceæ, a *Gynotrochea* growing in forest at an altitude of 4000 feet, and a Pellacalyx, also new species of *Eugenia* and of *Saurauia*.

THE original habitat of the coconut palm has often been the subject of speculation. In a paper read before the Ceylon branch of the Royal Asiatic Society, Mr. J. Ferguson, tracing the early history of the cultivation of the coconut palm in Ceylon, accepts the general dictum that the plant is not indigenous, and attributes its origin to nuts washed up by the sea. It is recorded that, at the instigation of a Singhalese king, a plantation was formed on the south coast as early as the middle of the first century, and subsequently King Prākrama Báhu the Great also interested himself in extending its cultivation.

IN the Journal of the Royal Horticultural Society (vol. xxix., part iv.) Mr. E. S. Salmon describes a white mildew disease that has been prevalent on shrubs of *Euonymus japonicus* in the south of England. From the mycelium on the surface of the leaf, hyphæ are produced that pierce the cuticle of the epidermis and form haustoria in the epidermal cells, thus enabling the fungus to maintain its parasitic life. The mycelium persists on the leaves through the winter, so that perithecial resting spores are not required and are not formed. The disease can be checked by collecting and burning in the winter all leaves that bear the white patches of hibernating mycelium; also treatment with sulphur or other fungicides is recommended.

THE paper on ramie read by Mrs. E. Hart before the Society of Arts, and printed in the Journal of the Society (April 6), is interesting, not only as it indicates some of the difficulties that had to be overcome in spinning and weaving, but also because it bears out the opinion that, given cooperation between producer and manufacturer, the cultivation, preparation, and weaving of ramie can be profitably undertaken. In the matter of decortication, Mrs. Hart advocates hand-stripping in preference to machines wherever cheap labour can be obtained, and recommends that the degumming process should be carried out under expert supervision in the mills. The fabrics that have been woven of pure ramie, warp and weft, vary from the lightest gossamer to a heavy cloth.

IN Hawaii, root disease of the sugar-cane produced by a species of the basidiomycetous fungus *Marasmius*—not improbably *Marasmius sacchari*—is so prevalent that a Bulletin (No. 2 of the Division of Pathology and Physiology) has been issued to provide information on the subject. The writer, Mr. L. Lewton-Brain, traces the connection between the fungus that attacks primarily the growing point of the root and the symptoms, similar to those caused by drought, of rolled-up leaves, matted leaf-sheaths, and undeveloped roots; also he indicates how the plant can be strengthened by judicious irrigation and by liming the soil. A variety possessed of a certain power of resistance to the disease has been found in the Yellow Caledonia, but a variety that is perfectly immune has yet to be discovered.

THE *Naturwissenschaftliche Wochenschrift* (vol. v., No. 8) contains a long paper by Dr. W. R. Eckardt on the climatic conditions of past geological times. The author deals specially with the climate of the Carboniferous and Tertiary periods, and concludes that the explanation of all changes of climate is to be sought in variations in the distribution of land and sea.

WE have received a copy of the tide tables for Charlottetown, Picton, and St. Paul Island, C.B., for the year 1906, issued by the Department of Marine and Fisheries of the Dominion of Canada. The tables are based on direct observations made at eleven localities in the south-western portion of the Gulf of St. Lawrence and in Cabot Strait. It has been ascertained that the tides can best be deduced from St. Paul Island, for which continuous records extending over four years are available.

DR. WALTHER VON KNEBEL contributes a paper to the *Naturwissenschaftliche Rundschau* (vol. xxi., No. 12) on the hot-spring areas of Iceland. A careful comparison of the conditions occurring in the regions of geysers and of solfataras leads the author to the conclusion that only a small part of the water ejected by the geysers is "juvenile," the bulk of it coming from the ordinary ground water. Geysers occur, in effect, where ground water is abundant and volcanic action relatively feeble, and solfataras where volcanic action is more vigorous and the amount of ground water deficient.

WE have received a copy of the meteorological records for 1905, published in the second annual report of the Agricultural Department of the British East Africa Protectorate, which extends, roughly speaking, from 5° N. to 5° S. latitude, the sea coast north of the equator forming part of the Italian Somaliland. The report contains rainfall observations at a large number of stations, and general observations at eight stations, several of which exceed 6000 feet in altitude. The work is a valuable contribution to meteorological knowledge, and will be found most useful when arrangements can be made for dealing with the meteorology of all our colonies according to some regular and properly organised plan. A good beginning was made in this direction by the Meteorological Council in a work entitled "Climatological Observations at Colonial and Foreign Stations, I., Tropical Africa," published in 1904, from tables prepared by Mr. E. G. Ravenstein. This work contained results from several of the stations included in the report of the Nairobi Agricultural Department.

IN his last report as secretary of the Smithsonian Institution of Washington, the late Dr. S. P. Langley dealt with the work of the Astrophysical Observatory for the year ending June 30, 1905. The evidence of solar variability is not in the report considered as conclusive. However, two lines of investigation have become very prominent in the work of the observatory, and these will almost certainly lead to a conclusion regarding this important question. The first of these is the almost daily bolometric examination of the large solar image formed by the great horizontal telescope, for the purpose of detecting changes in the transparency of the solar absorbing envelope. This work depends so little on the transparency of the earth's atmosphere that it can be done almost as well in Washington as at a station more favoured as regards atmospheric transparency. The year's work did not give evidence of very marked variations either in the transparency of the sun's envelope or in the supposedly dependent mean temperature of the earth, but, on the contrary, the results of

the observations continued most of the time near the mean in both respects. The second line of investigation is the determination of the total solar radiation outside our atmosphere, by observations with the bolometer and pyrheliometer at a station situated in a relatively clear and cloudless region and at a considerable altitude. This work is being done on Mount Wilson, in southern California, and it seems that the estimates it is hoped to obtain there will be so close an approximation to the truth that if a notable variation of solar radiation outside our atmosphere occurs the results will show it.

THE much-debated *n*-rays form the subject of a short note by Dr. P. Stefanelli in the *Rendiconto* of the Naples Academy, xi., 12. Referring to Meyer's experiments on the decrease of phosphorescence in sulphide of lime when placed in the glass receiver of an air pump, Dr. Stefanelli considers the effects to be attributable to the fall of temperature produced by the expansion of the air, and not to depend on the existence of *n*-rays for their explanation.

IN NATURE of January 11 (vol. lxxiii., p. 246) Mr. C. E. Benham pointed out that Swedenborg in his "Principia," published in 1733, constantly regarded both heat and light as ethereal undulations. Mr. I. H. H. Gosset, of St. Aubyns, Hove, now informs us that, as a matter of fact, in the year 1719, fourteen years before he published his "Principia," Swedenborg wrote a treatise "On Tremulation," in which he advanced the theory of ethereal undulations as applicable to our vital forces, light, heat, sound, &c.

In the *Philosophical Magazine* for April, Prof. Alfred W. Porter discusses the inversion points of the Joule-Kelvin effect for a fluid passing through a porous plug. The paper is a simple and straightforward deduction from the laws of thermodynamics. The condition that an infinitesimal difference of pressure on the two sides of the plug should give rise to no "cooling" or "heating effects" is given by the equation $T dv/dT - v = 0$, and when the pressure-volume-temperature equation is given, this condition determines a curve in the p, T or v, T diagram formed by the inversion points. Prof. Porter's paper is mainly taken up with examining the form of this curve corresponding to various assumed equations of state, such as that of van der Waals or Dieterici. From the form of the curves it is shown that in general two inversion temperatures exist for the same pressure, between certain limits of pressure; in the case of van der Waals's equation, the maximum limit is nine times the critical pressure. Finally, the author points out that the experimental study of these inversion curves affords a very valuable method of testing the relative validity of different equations of state. Theoretically also a knowledge of the inversion curve and the equation of state referred to any given thermometric scale afford sufficient data to determine the relation between that scale and the absolute temperature.

ACCORDING to the annual report of the Badische Anilin- und Soda-Fabrik, the price of artificial indigo is now one-third less than that of the natural product, the yield of which was last year so small that the requirements of the eastern markets could not be satisfied.

In the *Far Eastern Review* (vol. ii., No. 9), a monthly engineering journal published at Manila, Shanghai, and Yokohama, Mr. A. C. Hobble gives some excellent illustrations of the largest hydroelectric installation in southern Asia, at the Cauvery River Falls, in Mysore. There is a fall of 400 feet. Power is transmitted at a pressure of 35,000 volts over duplicate 3-phase lines a distance of 92 miles to the Kolar gold mines.

IN the *Chemiker Zeitung* we read of a serious laboratory accident to Dr. Franz Wartensberger, a German chemist, who is credited with having discovered a new explosive considerably more violent than dynamite, and to whom it is said that the American Government offered to pay one million dollars for the explosive, provided its discoverer were able to suggest a suitable method of firing it electrically instead of using a fuse. As Dr. Wartensberger was experimenting with this idea in mind an unexpected explosion is supposed to have taken place, and he was so badly hurt that it is doubtful whether he will recover.

THE ash of the Vesuvius eruption contained, according to Prof. Zinno's analysis, various quantities of silica, alumina, lime, magnesia, iron, and manganese; traces of ammonium chloride were frequently found, but these may possibly have been formed after the ash had fallen. No indications of either free sulphur or of free acid were detectable. The deposit of the ash is held to have been beneficial to vegetation rather than the reverse, especially in the growth of vines, grass, and vegetables, a fact that has been observed on other occasions.

IN an interesting note to the *Chemiker Zeitung* for April 21, Dr. M. C. Schuyten, of Antwerp, directs attention to the differences of temperature which are observable in chemical drying cupboards. Dr. Schuyten was led to consider the question experimentally from the fact that mercury phenyldimethylpyrazolone bromide was found to melt in a drying cupboard when the thermometer did not register a temperature so high as its melting point. The temperature of the air in the cupboard was observed in the great majority of cases to be very much less than that of the walls and shelves; a volatile liquid placed in a vessel in direct communication with the case evaporated much more quickly than when suspended by threads. From the numerical data given variations of 20° C. and more are noticeable.

WE learn from the *Chemist and Druggist* that the Committee on Ways and Means, which sat at Washington on March 30, authorised a favourable report on the Free Alcohol Bill, which removes the internal revenue duty from denaturised alcohol for use in the arts and sciences. The Bill has the approval of Commissioner Yerkes, and it is estimated that the annual loss in revenue will not exceed 100,000*l.*, and may not be more than 60,000*l.* It is held that the Bill will be of great benefit to manufacturers, and will afford an enlarged market for farm products from which alcohol is made. The sale of denaturised alcohol as a beverage or for liquid medicinal purposes is forbidden by the measure.

THE following particulars of two prizes offered by the French Government may prove of interest to industrial chemists:—(i.) The methylation of alcohol (prize of 20,000 francs). (1) The smell and taste of the proposed methylating addition must be such as to preclude the use of methylated alcohol as a drink; (2) the smell of the methylating addition must, however, not be so objectionable and strong as to prove harmful to those engaged in the manufacture of or in industries using methylated spirits, that is to say, the use of such bodies as acetylene, asafœtida, garlic, &c., is not permitted; (3) the method of methylating adopted may not leave any deposit on the wick or on any part of the lamp, if likely to interfere with the process of burning, as, for example, sea salt, sodium sulphate, alum, tincture of aloes, &c.; (4) the methylating additive may not be separable by fractional distillation; (5) it may not contain any substance which will attack the metallic parts of

lamps or motors, e.g. ammonia, nitrobenzene, sulphuric acid, carbon bisulphide, &c.; (6) nor may it be poisonous; (7) further, its cost must not be so high as to prejudice the use of methylated spirits for industrial purposes or household use; (8) its presence in methylated alcohol must be easily detectable; (9) it must possess advantages over that now in use in France, and not permit of any swindling of the Excise. It might be remarked that the discovery of a methylating additive which shall fulfil all the foregoing conditions is a matter of great difficulty; indeed, four years ago the Russian Government offered a prize of about 50,000 marks for a similar purpose, without, however, as yet having had a satisfactory entry. (ii.) The use of alcohol for illuminating purposes (prize of 50,000 francs). In this the competitors are allowed full scope as to the proposed system to be followed in order that alcohol may be used for illuminating purposes under the same conditions as petroleum. Suggestions, together with the necessary apparatus and methods of using, are to be sent to the Chef du Service des Laboratoires du Ministère des Finances, 11 rue de la Douane, Paris.

It was pointed out recently by a correspondent of the *Times* that though in the manufacture of pig-iron before 1880 England was preeminent, and the product was 50 per cent. more than that of the United States and Germany combined, yet ten years later the former country produced more than England, and the United States and Germany together twice as much. In 1903 Germany produced more than England, while the United States alone produced twice as much as England. In 1880 England produced 45 per cent. of the world's make, Germany 15 per cent., the United States 14 per cent. In 1903 the United States produced 39 per cent., Germany 20 per cent., and England only 19 per cent. With steel the case is even worse. Since 1880 steel has replaced wrought iron in nearly all manufactures, and in 1880 the United States and Germany manufactured about 30 per cent. less than England. In 1888 the United States equalled England. In 1893 Germany nearly equalled, and the United States largely exceeded England. About 1898 Germany's manufacture was much greater than that of England, and America's manufacture three times as great. These figures show that during the last twenty-five years England has receded from a position of great preeminence to the lowest place among the three great steel-producing countries. On the other hand, between 1900 and 1905, the importation of iron and steel into England increased very largely, the importation in 1905 being 1,435,000 tons, as against 741,402 tons in 1900.

MESSRS. E. DENT AND CO. have lately introduced a new astronomical clock which should find its way into many observatories where an accurate instrument is required at a moderate cost. For the sum of 21l. they supply a clock with a 10-inch dial, dead-beat escapement, and wooden rod seconds pendulum in a solid mahogany case; and after examining the instrument we have no hesitation in pronouncing it a marvel of cheapness.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN MAY:—

- May 1-6. Epoch of Aquarid meteoric shower (Radiant $338^{\circ}-2^{\circ}$).
2. 17h. Mercury at greatest elongation, $26^{\circ} 46'$ W.
 4. 10h. 4m. Minimum of Algol (β Persei).
 5. 13h. 33m. to 14h. 3m. Moon occults γ Virginis (mag. 3.0).
 6. 2h. Venus in conjunction with Mars. (Venus $0^{\circ} 5' S$).

NO. 1905, VOL. 74]

- May 11. 15h. Venus in conjunction with Jupiter. (Venus $1^{\circ} 11' N$).
15. Venus. Illuminated portion of disc = 0.921. Of Mars = 0.990.
 18. oh. Mars in conjunction with Jupiter. (Mars $1^{\circ} 6' N$).
 20. 23h. Ceres in conjunction with Moon. (Ceres $1^{\circ} 6' S$).
 24. 5h. Mars in conjunction with Moon. (Mars $4^{\circ} 57' N$).
 - „ 11h. 46m. Minimum of Algol (β Persei).
 25. 3h. Venus in conjunction with Moon. (Venus $4^{\circ} 51' N$).
 27. 8h. 35m. Minimum of Algol (β Persei).

COMETS 1906a AND 1906c.—The results of a number of observations of comets 1906a and 1906c, made at the Royal Observatory at Arcetri during February and March, are recorded in No. 4083 of the *Astronomische Nachrichten* by Prof. Abetti.

The same journal also contains the following set of elements, and an ephemeris extending to May 8, for comet 1906c, computed by Herr E. Strömberg from places determined on March 19 (Nizza), 22 (Glasgow, Mo.), and 29 (Arcetri).

Elements.

$$\begin{aligned} T &= 1906 \text{ Feb. } 20^{\text{h}} 7555 \text{ M.T. Berlin.} \\ \omega &= 274^{\circ} 46' \cdot 4 \\ \Omega &= 71^{\circ} 47' \cdot 7 \\ i &= 84^{\circ} 36' \cdot 8 \\ \log q &= 9 \cdot 84916 \end{aligned} \quad \left. \begin{array}{l} \\ \\ \\ \end{array} \right\} 1906 \cdot 0$$

THE TOTAL SOLAR ECLIPSE OF JANUARY, 1908.—For the information of those astronomers who intend to observe next January's eclipse, Dr. Downing has prepared a number of astronomical details for the observations at two islands in the Pacific which are favourably placed.

These two stations are Hull Island (long. = $172^{\circ} 13' W$, lat. = $4^{\circ} 30' S$) and Flint Island (long. = $151^{\circ} 48' W$, lat. = $11^{\circ} 26' S$), now the properties of Lever's Pacific Plantations Company, Port Sunlight, Cheshire, with whom intending observers should communicate.

As the errors of the moon's tabular places now amount to sensible and apparently increasing quantities, Dr. Downing warns observers that the calculated times of the several phases may differ sensibly from the observed times. To obviate the possible inconvenience arising from this source, he gives the number of seconds before the commencement of totality that the cusps will subtend specified angles (*Monthly Notices R.A.S.*, vol. lxvi, No. 5).

RADIANT POINT OF A BRIGHT METEOR.—In No. 4083 of the *Astronomische Nachrichten* Dr. Jiří Kaván publishes an account of a bright meteor observed at Prague at 6h. 21m. (M.E.T.) on October 1, 1905.

From observations of the altitude and azimuth, Dr. Kaván has deduced the following positions for the beginning and end points of the meteor's path:—

$$\begin{array}{llll} \text{Beginning} & \dots & \alpha = 293^{\circ} \cdot 1 & \dots \quad \delta = -2^{\circ} \cdot 6 \\ \text{End} & \dots & \alpha = 273^{\circ} \cdot 4 & \dots \quad \delta = -11^{\circ} \cdot 1 \end{array}$$

The duration of the meteor's flight was 2 to 2.5 seconds, and the colour of the object was green.

LUMINOUS PARTICLES IN THE CHROMOSPHERE.—The details of the equipment employed by Dr. Deslandres, in his experiments to determine whether the chromosphere contains luminous liquid or solid particles, are described in No. 14 (April 2) of the *Comptes rendus*. The results of the experiments were briefly described in these columns on April 19 (vol. lxxiii, p. 592).

NEW CATALOGUE OF DOUBLE STARS.—In No. 93 of the Lick Observatory Bulletins, Prof. R. G. Aitken publishes the detailed measures of 350 new double stars, A 901 to A 1250 inclusive. The stars contained in the present catalogue are similar in character to those published in Prof. Aitken's previous lists; 267 of them, or 76 per cent. of the entire number, have apparent distances less than $2''$, 31 of them less than $0'' \cdot 25$, while only 9 approach the limit of $5''$. Some of the pairs consist of closer components to Struve and Herschel stars, and most of them were observed with the 36-inch refractor.